

SEISMIC DESIGN CATEGORY DETERMINATION UNDER THE 2007 KENTUCKY BUILDING CODE

The earthquake design and construction requirements are intended to minimize hazard to life, increase the expected performance of buildings and non-building structures when subjected to earthquake effects and improve the capability of facilities that are required for post-earthquake recovery to function during and after an earthquake. The code provisions are the minimum criteria considered prudent and economically justified for life safety. The loads in this section are to be used with the strength design or allowable stress design methods cited in the structural material sections of the code.

The first step in the design of a structure for earthquake forces is the determination of the seismic design category. Section 1613.1 of the 2006 IBC, or 2007 KBC, permits the seismic design category to be determined in accordance with Section 1613 or ASCE 7. Each building is assigned the more restrictive seismic design category classification depending upon the site soil profile, the mapped spectral response accelerations at the site and the nature of the uses that occupy the building, using both Tables 1613.5.6(1) and 1613.5.6(2). The following only outlines the procedure used to determine seismic design category under the 2006 International Building Code (IBC) and does not cover the procedures for determining the seismic design category under the ASCE 7 standard.

Procedures for determination of the seismic design category

Step 1: Determine the mapped maximum considered earthquake spectral response acceleration at short periods, S_S , and at 1-second period, S_1 , for the site location from Table 1608.2 of the 2007 Kentucky Building Code (KBC).

Step 2: Determine the (soil) site class in accordance with Table 1613.5.2.

Step 3: Determine the site coefficients F_a and F_v from Tables 1613.5.3(1) and 1613.5.3(2) respectively.

Step 4: Determine the 5-percent damped design spectral response acceleration at short periods, S_{DS} , and at 1-second period, S_{D1} , as follows:

$$S_{DS} = (2/3)(F_a)(S_S)$$

$$S_{D1} = (2/3)(F_v)(S_1)$$

Step 5: Determine the seismic design category as prescribed by Tables 1613.5.6(1) and 1613.5.6(2). The highest of the seismic design categories from the two tables is the category assigned to the building unless Section 1613.5.6.1 is applicable. For example, if the seismic design category from Table 1613.5.6(1) is D and from Table 1613.5.6(2) it is C, then the building would be assigned a Seismic Design Category D.